

REMARKS

This Preliminary Amendment accompanies a Request for Continued Examination.

Claims 1, 3-17 and 19-54, of which claims 1, 17, 33 and 40 are independent, are pending for further examination. Claims 1, 6, 17, 22, 33 and 40 are currently amended. Reconsideration and allowance of the above-referenced application are respectfully requested in light of the foregoing amendments and the following remarks.

35 U.S.C. § 103(a) Claim Rejections

The claim rejections under 35 U.S.C. § 103(a) are as follows:

(1) Claims 1, 3-7, and 10 are rejected for allegedly being unpatentable over the Takahashi patent (US 6,665,439) in view of the Westman et al. reference.

(2) Claims 8, 11-13 are rejected for allegedly being unpatentable over the Takahashi patent in view of the Huang et al. patent (US Patent No. 5,671,290).

(3) Claims 14 and 16 are rejected for allegedly being unpatentable over the Takahashi patent in view of the Huang et al. patent and further in view of the Noda et al reference (Pub No. US2002/0030634).

(4) Claim 15 is rejected for allegedly being unpatentable over the Takahashi patent in view of the Huang et al. patent and further in view of Curtright et al. patent (Patent No. 5,844,570).

(5) Claims 9, 17, 19-33 and 40-54 are rejected for allegedly being unpatentable over the Takahashi patent in view of the Prakash et al. patent (US Patent No. 6,778,698).

(6) Claims 34, 36 and 38 are rejected for allegedly being unpatentable over the Takahashi patent in view of the Tessadro patent (U.S. Patent No. 7,003,161).

(7) Claims 35, 37 and 39 are rejected for allegedly being unpatentable over the Takahashi patent in view of the Acharaya et al. patent (U.S. Patent No. 6,094,508).

(A) Claims 1, 3-16 and 34-35 are patentable over the cited references.

Independent claim 1 recites a computer-implemented method of identifying one or more objects within an image, in which the method includes identifying both “edge pixels” and “non-edge pixels” in the image. Edge pixels are identified based on having a gradient value that satisfies a first threshold whereas non-edge pixels are identified based on having a gradient value that satisfies a second threshold value. Subsequently, an edge pixel then is selected and a “substantially connected component” is identified in which the substantially connected component includes both “non-edge pixels” and “edge pixels” that are substantially connected to the selected edge pixel. The number of non-edge pixels in the substantially connected component is based on a specified level of tolerance for non-edge pixels. Once a substantially connected component has been identified, a bounding area is established in which the bounding area has a perimeter that is “different from the substantially connected component” and which “surrounds the substantially connected component.”

For example, FIG. 1 (reproduced below) of the present application shows an identification system 100 in which one or more objects 120 are identified and extracted from an input image 110. As shown in the example, the input image 110 is passed to a segmentation module 140 of the identification system 100, in which the segmentation module 140 identifies both edge pixels and non-edge pixels within the image 110. The segmentation module 140 begins by selecting one of the identified edge pixels and then computing a substantially connected component that includes the selected edge pixel. The substantially connected component also includes non-edge pixels, which are pixels that have a gradient value equal to or below a specified threshold value. The number of non-edge pixels in the substantially connected component is determined based on a specified tolerance for non-edge pixels.

Once a substantially connected component has been computed, a bounding area, having a perimeter that is different from the computed component, is established in which the perimeter surrounds the component and segments the image. For example, as shown in FIG. 1, the input image is divided into multiple segments 170, each including one of the objects 120. The

bounding area then is passed to a processing module 150 which then extracts one of the objects based on the information received (*see* p. 4, line 5 – p. 5, line 5; p. 7, line 16 – p. 9, line 17).

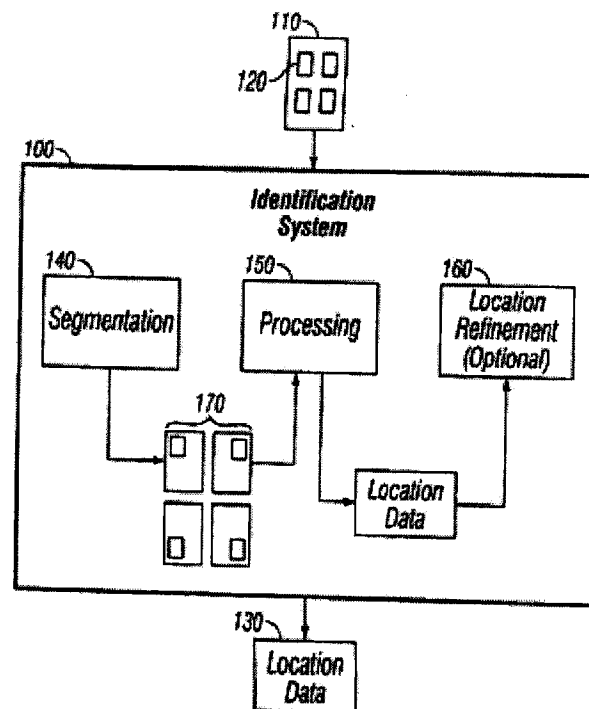


FIG. 1

The Office action concedes that the Takahashi patent fails to disclose “identifying a substantially connected component” that includes “non-edge pixels,” in which the number of non-edge pixels in the substantially connected component is “based on a level of tolerance for non-edge pixels,” as recited by claim 1, but relies on the Westman et al. reference for those feature (*see* final Office action, pgs. 4-5).

The Westman et al. reference discloses a procedure for image segmentation in which each successive stage of the procedure includes merging adjacent component regions such that a coarse analysis of the image can be obtained (*see* Westman et al. at p. 796, section 2, ¶ 4). During the first stage, the image is segmented into “basic connected components based on connectivity” of adjacent pixels. The components are determined by a test that compares a

threshold with a measure of grey-level or color-space distance between adjacent pixels (*id.*, at p. 796, section 2, ¶ 5). The components then are merged depending on the average contrast between adjacent components. There is no disclosure in the Westman et al. reference, however, that a number of non-edge pixels in a substantially connected component are based on a “level of tolerance for non-edge pixels.” Neither of the two tests that are applied in the Westman et al. reference specifies a level of tolerance for non-edge pixels. The first test simply compares grey-level or color-space distances between pixels to a threshold to determine whether the pixels should be connected. The second test then compares the average contrast between adjacent components. Neither the specified threshold nor the comparison of an average contrast corresponds to the claimed “level of tolerance for non-edge pixels.” Instead, they are merely tests to determine how close adjacent pixels or components are in color (or grey-level).

Even if the final segment produced by the segmentation operation of the Westman et al. reference includes non-edge pixels (which is not conceded), there is no disclosure, explicit or inherent, that a number of non-edge pixels in the segment is based on a “level of tolerance for non-edge pixels,” as recited in pending claim 1. Nor does the Westman et al. reference disclose any reason to establish the number of non-edge pixels based on a “level of tolerance for non-edge pixels.”

In addition, neither the Takahashi patent nor the Westman et al. reference discloses or renders obvious establishing a bounding area having a perimeter that is “different from the substantially connected component” and which “surrounds the substantially connected component,” as further recited by pending claim 1. Although the Takahashi patent discloses an image recognition process that includes applying edge detection to obtain the edge of an object (*see* FIG. 4; col. 12, lines 47-67), the edge image produced by this process (which the Office alleges corresponds to the claimed “bounding area”) is identical to the edge image that the Office action alleges corresponds to the claimed “substantially connected component” (*see* final Office action at p. 4). Therefore, the perimeter of the edge image produced by the Takahashi patent is clearly not “different from” a substantially connected component nor does it “surround” a substantially connected component, as recited in pending claim 1.

In addition, none of the other cited references, alone or in combination, are understood to disclose or render obvious the subject matter of pending claim 1.

The Prakash et al. patent discloses a technique to segment an image that includes a multi-scale segmentation process operating on an image and a set of edge chains. Although the Prakash et al. patent discloses the use of an edge chain, the relied upon portion of the Prakash et al. patent is not understood to disclose the features missing from the Takahashi patent and the Westman et al. reference.

The Huang et al. patent discloses a face recognition system that includes locating and extracting face regions belonging to known people from a set of model images, and determining the face pose for each of the face regions extracted (*see* Abstract). However, the relied upon portion of the Huang et al. patent is not understood to disclose the features of pending claim 1 that are missing from the Takahashi patent and from the Westman et al. reference.

The Noda et al. reference discloses an image synthesizing apparatus for producing a synthetic image that consists of a background image and at least a main image superimposed on the background image (*see* Abstract). However, the relied upon portion of the Noda et al. reference is not understood to disclose the features missing from the Takahashi patent and the Westman et al. reference.

The Curtright et al. patent discloses a computer-implemented method for generating digital map images of a uniform format that includes: cropping a bit mapped map image corresponding to a desired geographic area; moving the boundaries of the selected map image into a tessellated shape and then re-sizing the map image to contain a predetermined pixel area (*see* Abstract). The relied upon portion of the Curtright et al. patent is not understood to disclose the features missing from the Takahashi patent and the Westman et al. reference.

The Tessadro patent discloses a method to detect and locate an edge based on characteristics of the image, such as texture, intensity and color. However, the relied upon portion of the Tessadro patent is not understood to disclose the features missing from the Takahashi patent and the Westman et al. reference.

The Acharya et al. patent discloses a method for determining a threshold for edge detection based on local intensity information. However, the relied upon portion of the Acharya et al. patent is not understood to disclose the features missing from the Takahashi patent and the Westman et al. reference.

At least for the foregoing reasons, claim 1 should be allowed.

Claims 3-16 and 34-35 depend from claim 1 and should be allowed for at least the same reasons as claim 1.

(B) Claims 17, 19-32 and 36-37 are patentable over the cited references.

Claim 17 recites a computer program product, tangibly stored on a computer-readable medium, for identifying one or more objects within an image, that includes instructions for “identifying a substantially connected component” that includes non-edge pixels, in which the number of non-edge pixels in the substantially connected component is “based on a level of tolerance for non-edge pixels,” and establishing within the image a bounding area having a perimeter that is “different from the substantially connected component” and which “surrounds the substantially connected component.”

None of the cited references, alone or in combination, discloses or renders obvious the subject matter of independent claim 17. As set forth in reference to claim 1, the cited references are not understood to disclose or suggest a substantially connected component that includes non-edge pixels, in which the number of non-edge pixels is “based on a level of tolerance for non-edge pixels” or establishing a bounding area that has a perimeter which “surrounds the substantially connected component” and that is “different from the substantially connected component.”

Accordingly, claim 17 should be allowed. Claims 19-32 and 36-37 depend from claim 17 and should be allowed for at least the same reasons as claim 17.

(C) Claims 33 and 38-39 are patentable over the cited references.

Claim 33 recites a computer program product, tangibly stored on a computer-readable medium, for identifying multiple objects within a scanned image, that includes instructions for identifying a substantially connected component that includes non-edge pixels, in which the number of non-edge pixels in the substantially connected component is “based on a level of tolerance for non-edge pixels” and establishing a bounding area that has a perimeter which “surrounds the substantially connected component” and that is “different from the substantially connected component.”

None of the cited references, alone or in combination, are understood to disclose or render obvious the subject matter of independent claim 33. There is no disclosure or suggestion in the cited references of identifying a substantially connected component that includes non-edge pixels, in which the number of non-edge pixels in the substantially connected component is “based on a level of tolerance for non-edge pixels” or establishing a bounding area having a perimeter that is “different from the substantially connected component” and which “surrounds the substantially connected component.”

At least for the foregoing reason, claim 33 should be allowed.

Claims 38-39 depend from claim 33 and should be allowed for at least the same reason as claim 33.

(D) Claims 40-54 are patentable over the cited references.

Independent claim 40 recites, in part, a system having a processor operable to perform operations including “identifying a substantially connected component” that includes non-edge pixels, in which the number of non-edge pixels in the substantially connected component is “based on a level of tolerance for non-edge pixels,” and establishing, within the image, a bounding area having a perimeter that is “different from the substantially connected component” and which “surrounds the substantially connected component.”

None of the cited references, alone or in combination, are understood to disclose or render obvious the subject matter of independent claim 40. There is no disclosure or suggestion in the cited references of a processor “identifying a substantially connected component” that

includes non-edge pixels, in which the number of non-edge pixels in the substantially connected component is “based on a level of tolerance for non-edge pixels,” or establishing, within the image, a bounding area having a perimeter that is “different from the substantially connected component” and which “surrounds the substantially connected component.”

At least for the foregoing reason, claim 40 should be allowed.

Claims 41-54 depend from claim 40 and should be allowed for at least the same reason as claim 40.

Conclusion

It is believed that all of the pending claims have been addressed. However, the absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper, and the amendment of any claim does not necessarily signify concession of unpatentability of the claim prior to its amendment.

The Applicant respectfully requests that all pending claims be allowed.

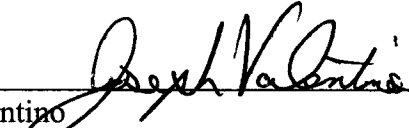
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Respectfully submitted,

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